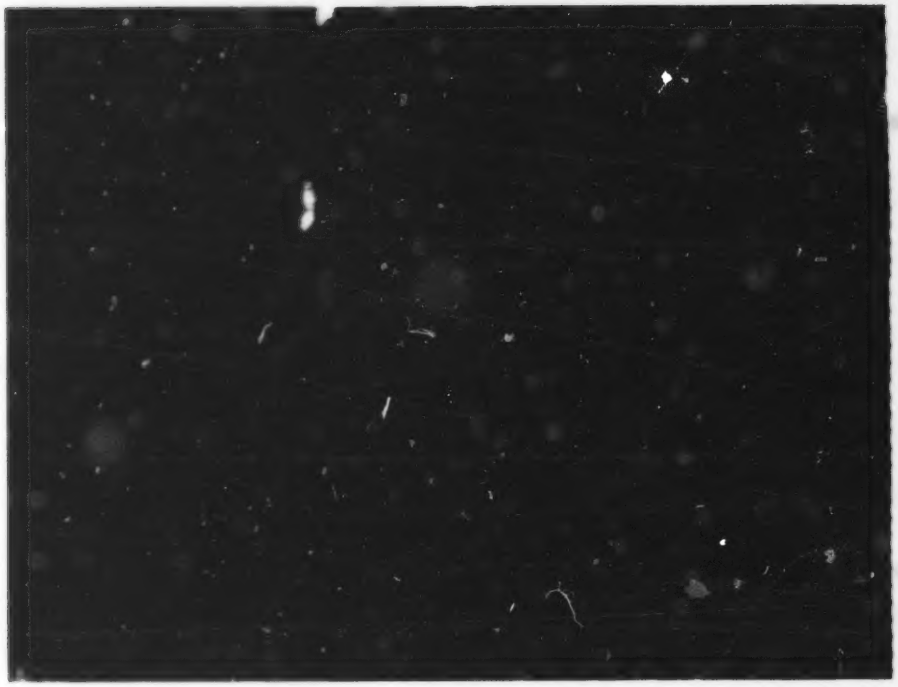
Atomic Energy of Canada Limited



1988 • 1989

Annual Report

Since nuclear fission was discovered 50 years ago, nuclear energy has emerged as a clean, safe and economical way to generate electricity — a way that must be further explored to meet both energy and environmental requirements.

The cover photo was taken by Reto Zach, an ecologist at AECL's Whiteshell Nuclear Research Establishment near Pinawa, Manitoba. Dr. Zach has recently completed a study on the transfer of radionuclides from soil to plants to moose to wolves to help formulate realistic environmental assessment models to assure the safety of a nuclear fuel waste disposal site.

90-05765//

Letter of Transmittal

The Honourable Jake Epp, P.C., M.P.
Minister of Energy, Mines and Resources
House of Commons
Ottawa, Ontario

Dear Mr. Epp:

In accordance with subsection 150(1) of the Financial Administration Act, I am pleased to submit the Annual Report of Atomic Energy of Canada Limited (AECL) for the fiscal year ended March 31, 1989, together with the financial statements and report of the Auditor General.

For AECL, 1988-89 was a year of considerable accomplishments and transition. For the eleventh consecutive year, the corporation achieved a profit. Significant progress was made in preparing strategies that will enable AECL to develop and maintain the CANDU nuclear option for the benefit of all Canadians.

The corporation also continued to enhance its reputation for technological excellence, due in large part to the tireless and exceptional dedication of James Donnelly who retired as AECL President and Chief Executive Officer at fiscal year-end. We appreciate his 11 years of service to both AECL and the Canadian nuclear industry.

Special tribute should also be paid to my predecessor Basil Bénéteau who retired as Chairman and Director in June 1988. Mr. Bénéteau devoted a great deal of time and effort to guiding the Board's deliberations.

Sadly, 1988 also was marked by the sudden passing of a member of the Board of the Directors, Louise Martin of Montreal. Mrs. Martin was a devoted member of the Board of Directors and of the Committee of Executive Management and Compensation. She will be missed.

To continue the initiatives begun by these individuals, AECL's Board of Directors looks forward to working with the corporation's Shareholder to ensure AECL's and the Canadian nuclear industry's successful future. Your personal interest and support in a successful Canadian nuclear future is appreciated.

Respectfully submitted,

Marnie Paikin

Marnie Paikin
Acting Chairman of the Board

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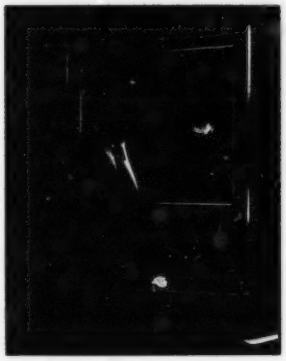
Financial Highlights

(millions of dollars)

	1989	1988
Nuclear Power Operations		
Revenue	158	165
Operating profit	35	17
Subsidiaries divested		
Revenue	70	125
Operating profit	14	16
Net income	23	10
Parliamentary appropriations	203	175
Research & Development Expenses	248	251

President's Message



This past year was marked by a gradual shift in public appreciation of the environmental benefits of nuclear energy, an appreciation which will provide a long-awaited springboard for the revival of the nuclear industry both in Canada and overseas.

As scientists and environmentalists from around the world focused on the consequences of the "greenhouse effect", attention turned to nuclear energy. At the "World Conference on the Changing Atmosphere", the delegates not only concluded that the world should cut carbon dioxide emissions by 20 percent by the year 2005, they identified the need to revisit the nuclear power option.

Support for nuclear power came from other sources as well. After rigorous examination of the nuclear industry, the House of Commons Standing Committee on Energy, Mines and Resources concluded that "maintaining the nuclear power option is vital to Canada's interests" and recommended that the Government of Canada increase its financial support of AECL and guarantee an increased level of support for five years. These favorable findings reinforced the opinions of the Energy Options Advisory Committee that the CANDU "nuclear option should be sustained as a component of Canada's energy mix". According to its report, "nuclear generation in Canada has been a reliable source of power at relatively predictable and stable costs. It presently has environmental advantages over coal in terms of acidic, particulate and radioactive emissions, and it does not generate carbon dioxide."

Despite the growing appreciation of nuclear energy as an environmentally sound source of energy, the CANDU reactor order book remained empty at year-end. There were, however, encouraging signs, both at home and overseas, that major new CANDU projects will be negotiated in the coming year for completion in the mid-1990s.

The Korean Electric Power Corporation has signaled a vote of confidence in our existing design, the CANDU 6. Accordingly, the Korean Ministry of Energy and Resources has included in its expansion plan, announced in December 1988, a second CANDU 6 on the Wolsong site, to be in service by 1997.

I have no doubt that, by the first decade of the twenty-first century, CANDU will have recaptured and expanded its share of the world energy market, provided that the national will exists to capitalize on this unique Canadian high technology success.

CANDU 3

In preparation for the rejuvenation of the nuclear industry, CANDU Operations has completed the first year of a standard product design program for an exciting new 450 MWe nuclear reactor — the CANDU 3. This product is being designed by a team of our most senior and experienced designers and engineers using advanced computer-aided design techniques and incorporating the latest nuclear technology. The CANDU 3 design capitalizes on proven, highly reliable and safe generic CANDU components and technology, while adopting major advances in station layout, construction, maintenance and operation. It promises significant capital cost reductions from enhanced power output, world-leading reactor control technologies, modular construction techniques and automated, high-quality manufacturing processes. Equally important, AECL is planning for up-front licensing by the Atomic Energy Control Board (AECB) to ensure that all safety-related requirements are understood and agreed on prior to the construction phase.

The federal government has shown a great deal of confidence in the CANDU 3 and has supported our new thrust. With anticipated levels of commitment federally, provincially and from the private sector, we expect to build at least three CANDU 3 reactors in the next decade.

Internationally, other nuclear vendors have also realized that smaller nuclear plants, in the size range of CANDU 3, will dominate the nuclear power market in the next two decades. It is gratifying to observe that these companies are abandoning their traditional stance and following our lead.

Rationalization of CANDU Design Resources

Canada's initial commitment to nuclear power in the 1950s began with the launch of a national nuclear program, strengthened and sustained by cooperation between AECL and Ontario Hydro. Today, Ontario Hydro generates half of its electricity using CANDU reactors. The large CANDU construction program of the 1970s and early 1980s placed a heavy demand on the available human resources and led Ontario Hydro to develop most of the nuclear reactor design and construction skills in parallel with AECL. However, this strengthening of Ontario Hydro, combined with the recent dearth of nuclear reactor orders, has resulted in excess nuclear design effort in Canada today.

If Canada is to maintain a healthy nuclear power capability, the full resources of AECL's CANDU Operations, Ontario Hydro and the private sector must be combined. Thus, rationalization of these resources in the national interest remains high on AECL's agenda. We therefore welcome the current initiatives of the federal and provincial governments in restructuring the Canadian nuclear industry to ensure a continuing strong CANDU program.

Commercial Work and New Businesses for R & D

Along with continued commitment to R & D, AECL's corporate strategy involves diversifying its technologies to spawn innovative Canadian companies and develop new products and services. By using our scientific and technical experts to

develop these commercial ventures, we have maintained the R & D team needed to sustain and develop Canada's national nuclear program.

AECL's new business thrust has been channeled into three paths:

- first, enhanced commercialization, which has focused on contract R & D and service and licensing work for customers outside the nuclear spectrum. Our work for Morton Thiokol on the space shuttle seals is typical;
- second, the development of new nuclear products, such as MAPLE research reactors, SLOWPOKE district heating reactors and industrial accelerators. These products require extensive development and some may have slow market penetration, but they represent enormous market opportunities in the long term; and
- third, the spin-off of new high-tech businesses dedicated to the advancement of new technologies not yet established in Canada. There are several instrument businesses (for example, SENSYS and TUNDRA) currently maturing within the AECL family. Bubble Technology Industries went private on April 1, 1988, and not only attracted outside venture capital, but since then has exceeded all its business goals. Such opportunities would benefit both private sector partners and ourselves if AECL were to share equity in these new companies. An initiative is under way with the federal government to develop a mechanism to achieve this synergy.

Privatization of AECL Divisions

Already, AECL has spawned two major business ventures. Acting on a directive from our shareholder, two of our divisions — the Radiochemical Company and the Medical Products Division — were incorporated and transferred to the Canada Development Investment Corporation. Known today as Nordion International Inc. and Theratronics International Limited, respectively, these divisions operated separately from AECL for the second half of the year. Although we were sorry to lose them because of their profitability and their long-standing role in the AECL family, our relationship will remain strong. In fact, AECL's Research Company will continue to be Nordion's key supplier of medical diagnostic isotopes.

Outstanding Research/Aging Facilities

There continues to be a pressing need for funding of basic and applied research and development programs in our national nuclear laboratories. AECL's major laboratories at Chalk River, Ontario, and Pinawa, Manitoba, make a major contribution to the world's pool of scientific knowledge as well as serving the nuclear industry in the design and proof-testing of reactor prototypes, solving operational problems in nuclear generating stations, and providing the science and technology behind safety, environmental protection and waste management. Our scientists and engineers have won worldwide acclaim for their work in mathematics, physics, chemistry, environmental science, health sciences, metallurgy, geology, thermal hydraulics and a host of related disciplines.

Other countries have developed similar scientific and engineering infrastructures, but none has achieved so much for so little cost. In recent years, major economies have been achieved while world-leading programs in waste management and safety have been accomplished. Nevertheless, the lack of sufficient investment in our laboratories over the past decade has left us with aging equipment and many facilities in need of refurbishment or replacement. To protect our national investment in nuclear energy, it is imperative that the requisite funds be injected over the next few years into our laboratories to re-establish state-of-the-art equipment and facilities. Unless this commitment is made, Canada's nuclear R & D capability will decline.

Optimism for the Future

On April 9, 1989, James Donnelly, President and Chief Executive Officer of AECL for 11 years, retired from the corporation. Canada owes a great debt to Mr. Donnelly for his tremendous effort to make and keep Canada's nuclear industry competitive.

On April 9, 1989, I assumed the responsibilities of AECL President and Chief Executive Officer, on an acting basis. My experience with AECL, most recently as President of the Research Company, has convinced me that the major assets of the corporation are the outstanding women and men of our most resourceful staff. They are making a major contribution to the future of Canada as an internationally competitive high-technology nation, and as a good place to live.

For the eleventh consecutive year AECL closed the books with a profit. The corporation met most of its goals in 1988-89, the exceptions being the winning of additional funding from the utilities and provinces for R & D and the commitment of the federal government to a multi-year funding of the nuclear program. By year-end these questions were being addressed at federal and provincial levels.

I remain optimistic that AECL will continue to play a leading role in providing Canadians with the benefits of clean, safe, economical nuclear technology.

Stanley R. Hatcher
Acting President and
Chief Executive Officer

Research Company

Like many companies, AECL has placed a high priority on protecting human health and the environment. Indeed, AECL's Research Company is playing a leading role in the research and development of radiological protection devices and services that can be applied both inside and outside the nuclear industry.

Health and environmental science programs at the Research Company laboratories are wide ranging. They involve basic science research aimed at refining our understanding of the nature and magnitude of biological effects, at understanding how the human body handles contaminants, and at determining how contaminants move in and affect the environment. These programs also involve the development of technologies for monitoring, controlling, handling and managing hazardous materials and they are equally relevant to protection against radioactive and many non-radioactive hazardous materials.

Waste Management

An important aspect of the company's work in environmental and health protection is the Canadian Nuclear Fuel Waste Management Program, managed by AECL at its Whiteshell Laboratories in Pinawa, Manitoba. The program involves the development of the technology for the deep geological disposal of used nuclear fuel, a concept which has been thoroughly investigated by AECL during a 10-year research and development program. In September 1988, the concept was referred to the Minister of the Environment for review according to the federal environmental assessment and review process.

The Canadian Nuclear Fuel Waste Management Program made strides during 1988-89 in its technical programs. Continued progress was made developing and evaluating the performance of engineered barriers for a used-fuel disposal facility. The construction phase of AECL's Underground Research Laboratory, near Lac du Bonnet, Manitoba, was completed. The shaft now extends 443 metres below the surface, and shaft stations provide access for experiments at several levels.

International cooperation in waste management continued successfully during the year as well. Although the subsidiary agreement with the U.S. Department of Energy was set aside in June 1988 because of changes in U.S. legislation, 80 percent of the program under that agreement was successfully completed by then, providing $19.5 million in revenue as well as a valuable enhancement of our research program.

Cooperative R & D in Canada supported by Sweden and Japan continued, as did Canadian participation in the OECD/NEA (Organization for Economic Cooperation and Development/ Nuclear Energy Agency) International Stripa Project in Sweden.

The development of permanent disposal facilities for low-level radioactive wastes at Chalk River Nuclear Laboratories (CRNL) advanced another step with the amalgamation of the technical and operational resources as a single functional unit.

Safety R & D

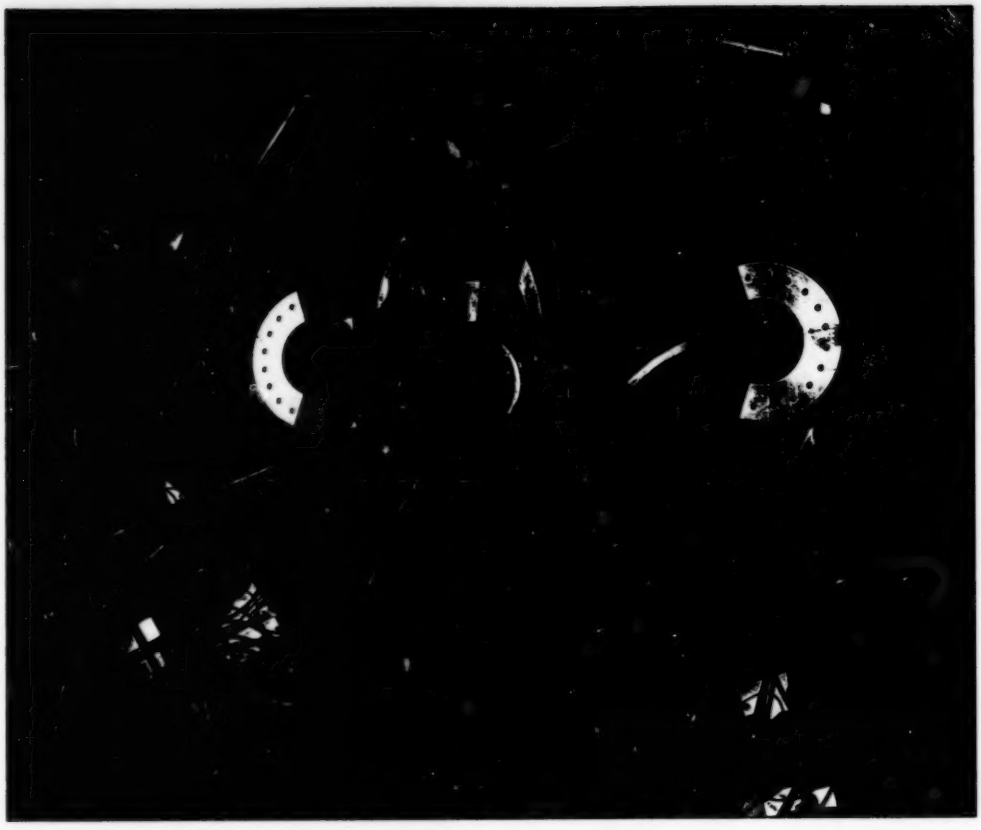
Progress continued in the development and application of the CATHENA thermalhydraulics computer code. This code is becoming accepted by the Canadian nuclear industry as the standard thermalhydraulics code for reactor safety studies.

Construction of a radioiodine test facility, designed to study the behavior of fission products in reactor containment following a severe accident, is complete and the facility has been commissioned. Already, it has achieved international recognition resulting in a major contract with an international consortium to research fission product behavior in light water reactors.

Fuel Channel R & D

Research Company experts continued to focus on enhancing pressure tube performance. One of the factors limiting the lifetime of pressure tubes in power reactors is deuterium ingress. Preliminary tests have shown that chromium plating of the inside of the pressure tube end fitting may substantially reduce or eliminate such ingress. A development program is under way to fabricate and test full-size production joints to conclusively demonstrate the benefit of this technique.

AECL studies have pointed to a new way of identifying and measuring hydrogen diffusion paths in CANDU pressure tubes that uses the superconductivity of certain zirconium pressure alloys. Involving Whiteshell and Chalk River staff, this effort could lead to breakthroughs in studying and controlling hydrogen ingress to pressure tubes and in relating ingress to mechanical and corrosion properties, such as stress corrosion cracking.



The 8-pi spectrometer is a unique experimental facility in the Tandem Accelerator Superconducting Cyclotron (TASCC) complex at the Chalk River Nuclear Laboratories. Collaboration with scientists from the university community is a key aspect of both the funding and usage of the facility. In this photo, Alfredo Galindo-Uribarri, a graduate student from the University of Toronto, is shown with the spectrometer and a new 16 detector array that has recently been added to allow the detection of charged particles.

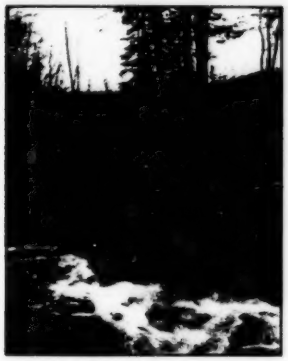
AECL scientists continue to develop tooling for removing thin samples of pressure tube material from the inside surfaces of selected pressure tubes during reactor shutdowns. Prior to the development of the pressure tube sampling tool, information on hydrogen ingress to pressure tubes could be obtained only by destructively examining pressure tubes removed from reactors. Now, statistically significant sampling can be carried out nondestructively and, equally important, selected pressure tubes can be studied during their lifetime.

Advanced Fuel Cycles

Beyond work in fuel waste management, considerable effort was given to the development of advanced fuel cycles. The current CANDU reactor, fueled with natural uranium in a once-through fuel cycle, produces more energy per kilogram of mined uranium than any other commercial power reactor system. CANDU reactors can also operate on a variety of advanced fuel cycles that allow significantly better utilization of uranium. As part of a long-term study of advanced fuel cycles, a program of reactor physics using advanced experimental fuels is being carried out to validate nuclear data libraries and reactor core simulation methods. These fuel cycles will become increasingly important as the use of nuclear power expands to meet the world's growing demand for energy.

In a parallel program, a new fuel bundle, called CANFLEX, is being developed to maximize advanced fuel cycles. CANFLEX is a logical extension of the current design of fuel bundles. It is compatible with a wide range of fuel cycles including natural uranium and slightly enriched uranium. The latter offers Canadian utilities a potential saving in fuel cycle costs of about 30 percent (or about $100 million per year for the currently committed Canadian nuclear capacity) and a three-fold reduction in the volume of spent fuel.

Research Company



Environmental Research Branch personnel at the Chalk River Nuclear Laboratories routinely monitor the surface waters leaving the site for radioactive contamination. Peggy Beaulieu is shown here collecting a weekly water sample at the Perch Lake weir.

Advanced Ceramics

AECL's expertise in pressure tubes is matched by its leadership in advanced ceramics. In developing uranium dioxide fuel for use in the CANDU reactor, the AECL Research Company has established a world reputation for applied R & D in ceramics. This capability is now being exploited, in cooperation with Canadian industry, to develop advanced ceramic products and processes. In the field of superconducting ceramics, AECL has joined forces with Canada Wire and Cable Ltd. and Hydro-Québec to develop technology for producing pliable wires from high-temperature superconducting ceramics. The successful development of this technology will make practical the application of these materials in a number of areas, including energy storage and transmission, electric motors and industrial accelerators.

Fusion and Tritium Technology

AECL is also taking a leadership role in the development of fusion and tritium technology. Tritium is the prime fuel for nuclear fusion power. AECL's experience and capabilities in the extraction, handling and storage of tritium provide a recognized place for Canada, through the Canadian Fusion Fuels Technology Program, in the multi-billion dollar world fusion power development program. This role includes the design and supply of tritium-handling systems, courses in tritium handling, and the exchange of tritium experts to foreign laboratories.

AECL successfully completed the CRITIC-1 fusion breeder blanket test in the NRU reactor at Chalk River, the largest and most significant breeder blanket experiment done to date. Our expertise in tritium health and safety research continues to make its mark with the successful international study of tritium dispersion in the environment at Chalk River Nuclear Laboratories.

TASCC

The year 1988-89 also marked the completion of a complex upgrade of the Tandam Accelerator SuperConducting Cyclotron (TASCC) facility at Chalk River. The installation of an 8-pi spectrometer, jointly owned and operated at TASCC by AECL and the University of Montreal and McMaster University, has produced exciting information on a new type of nuclei — one that is approximately the shape of a football and is called "superdeformed".

Health Sciences

Advances were made too in the development of a cancer screening assay. The screening assay for inherited variations in radiosensitivity has been tested on more than 200 blood samples from anonymous healthy donors. The next test on an equal number of samples from patients at cancer clinics is under way and is expected to be completed within the coming year. The study is aimed at determining whether those individuals whose cells are abnormally sensitive to radiation in laboratory assays are, in fact, abnormally sensitive to radiotherapy in cancer clinics, and whether these individuals are prone to cancer.

Business Development

In general, along with pure and applied R & D, good progress has been achieved in developing new business opportunities. Strong market signals indicate a growing demand for accelerator-produced radiation for sterilization and materials modification. AECL's IMPELA high-power accelerator, which is well-positioned to serve this emerging market, should be completed, commissioned and tested at full power in the new year. TUNDRA has completed product engineering and calibration of the INSIGHT steam quality monitoring system and opened, in the spring of 1989, sales offices in California and Calgary to introduce the technology to heavy oil producers. Manufacturing for the North American market will take place in Calgary. Improvements have been made to the design of the FerroSCAN3(R), the flagship product of the AECL business unit SENSYS that detects early wear in bearings or gear boxes. Arrangements have been made with a major U.K. helicopter service company to incorporate FerroSCAN3(R) into their engine health monitoring system.

AECL's Local Energy Systems business unit received encouraging market signals from its commercial negotiations in Hungary, Czechoslovakia and Korea. The SLOWPOKE Demonstration Reactor at Whiteshell successfully completed tests at the 200 kW level and Atomic Energy Control Board approval has been requested for operation at 1 MW. Operation at the 1 MW power level is a key target for the coming year.

Groundwater studies are a key aspect of AECL's Waste Management Program. Soil cores such as the one taken by Pius Durepeau and Eddie McGee, and examined here by Karen Inch, provide the information needed to determine physical and chemical properties that are then incorporated in computer models used to predict the behaviour of groundwater.

Commercial

AECL has used neutron radiography for the examination of experimental nuclear fuel for about 20 years. Neutron radiography, a nondestructive testing technique similar to X-ray radiography using a beam of neutrons from a reactor rather than X-rays, is widely used for examining air-cooled turbine blades for blocked cooling passages. AECL now offers a neutron radiography service to the Canadian and foreign aerospace industry on a commercial basis, using the NRU reactor.

AECL's commercial activities have not only yielded revenue but have continued to enhance the company's reputation. Notable was the success of the work for Morton Thiokol in which AECL's expertise in sealing technology was applied to establish control requirements and inspection methods for the O-rings used in the U.S. space shuttle booster rocket segments. The work contributed in a small but significant way to the successful flight of Discovery.

Services and Facilities

Two projects that continue into the new year are the construction of the MAPLE-X10 reactor and a facility for producing low-enriched uranium fuel.

Important to all AECL's R & D activities are the facilities and staff at the two sites. The Research Company employees will continue to build on the achievements of the past year and reach for new targets in 1989-90.

CANDU Operations

During 1988-89, AECL CANDU Operations consolidated its established role of providing engineering and technical support to existing nuclear power stations with its more recent thrust of offering engineering services to non-CANDU clients both in the nuclear and non-nuclear sectors.

New CANDU Projects

High priority was also assigned to the design of the new CANDU 3, a 450-megawatt reactor derived from earlier CANDU designs. The CANDU 3 incorporates many advanced features which make it ideally suited to smaller utilities and a variety of site conditions. Significant funding, a dedicated team of more than 200 AECL staff, and additional support from private sector consultants, equipment suppliers and utilities were allocated for this first year of the CANDU 3 standard product design program.

The program had an auspicious start. Achievements included:

- completion of plant layout, reactor design and design of major key systems and equipment;
- delivery of the conceptual safety report, licensing plan, safety assessment and safety design guides to the Atomic Energy Control Board;
- completion of a project cost study to ensure competitiveness with the total unit energy cost of non-nuclear plants; and
- completion of a joint venture study with companies involved in modularization technology.

Although the development of the CANDU 3 was predominant, the work which began last year on the advanced CANDU program also gained momentum. An advanced CANDU design is being developed for Japan's Electric Power Development Company (EPDC). The technical evaluation showed that the Japanese licensing requirements can be met by the CANDU 6 and CANDU 9 designs. In addition, the CANDU 6 and CANDU 9 can provide increased power output through the use of slightly enriched uranium fuel. Further technical assessment and economic evaluation of these concepts are continuing and will determine potential improvements in energy costs available through the advances in design and construction techniques that have been developed for the CANDU 3 product.

Also being evaluated for CANDU is the use of advanced fuel cycles which offer increased uranium resources utilization, reduced fueling costs, smaller irradiated fuel volumes and the ability to form a symbiotic fuel cycle kinship with Japanese light water reactors. EPDC is exploring these options to strengthen its case for inclusion of CANDU in the Japanese nuclear program.

The five-unit Cernavoda station in Romania and the four-unit Darlington plant in Ontario are still under construction. A Canadian team is stationed in Romania to assist the client with engineering, procurement, quality assurance and construction. In Ontario, AECL has provided engineering services for reactor and shutdown systems designed for Darlington, where startup of the first unit is imminent.

CANDU Performance

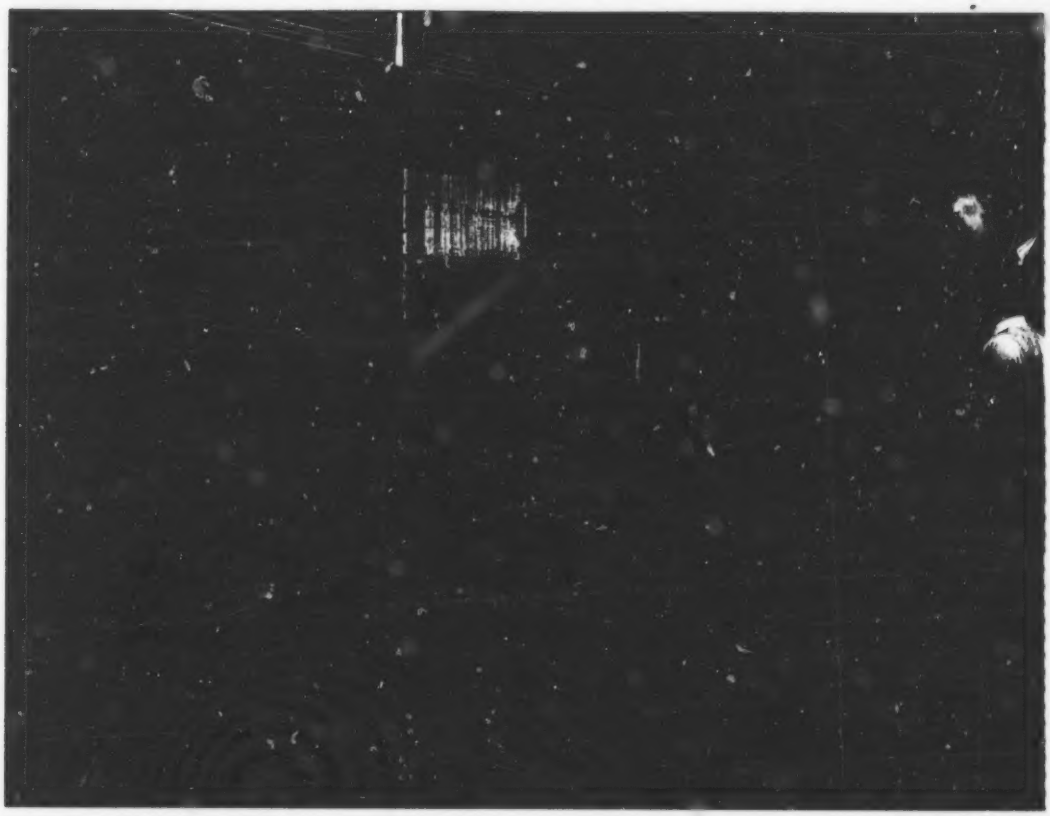
The four CANDU 6 stations had another outstanding year, achieving the following capacity factors: Point Lepreau, 96 percent; Gentilly-2, 94 percent; Embalse, 86.8 percent; and Wolsong, 79 percent. CANDU Operations' support to these stations included safety and licensing analysis, procurement of spare parts, tooling development for fuel channel inspection and replacement, and engineering for various design improvements.

Due to its exceptionally high capacity factor, Point Lepreau has become the first CANDU 6 station to require expansion of its irradiated fuel storage capacity. In collaboration with AECL's Research Company, CANDU Operations was contracted by New Brunswick Power to provide design, tooling and equipment for storage of spent fuel in above-ground concrete canisters at the Point Lepreau site. Other CANDU 6 owners have indicated that they intend to use similar storage facilities.

A significant level of support continued to be provided to Ontario Hydro's operating nuclear stations. As part of the large-scale fuel channel replacement program for Pickering Units 3 and 4, special tooling for use in the replacement of the fuel channels was designed, fabricated and refurbished. AECL also provided a spring location and repositioning system for use at the Bruce station and a set of single fuel channel replacement tooling.

During the year, testing was completed on three fueling machines destined for the Romanian CANDU 6 units. In addition, several major test and development programs were started to prove and demonstrate some of the new design features of CANDU 3, such as modular plug-in type fuel channels, telescoping mechanical zone control units and improved fuel-handling equipment.

AECL design engineers Bob Banting and Henry Woo, assisted by Jan Dyer, program shutdown system software for the Ontario Hydro Nuclear Generating Station at Darlington, Ontario.



Decommissioning

AECL further extended and applied its considerable expertise in decommissioning nuclear power plants. Following the earlier successful decommissioning of the Gentilly-1 and Douglas Point stations, CANDU Operations, in collaboration with AECL's Research Company and Ontario Hydro, completed the decommissioning of the Nuclear Power Demonstration (NPD) Reactor station near Rolphton, Ontario, leaving the site in a static state, requiring only remote surveillance and inspection. This expertise has placed AECL in an excellent position to pursue other decommissioning projects worldwide.

Other Nuclear Activities

In the non-CANDU sector, the company's nuclear know-how was successfully applied to a number of projects. CANDU Operations staff assisted in completing the commissioning of the CIRENE prototype reactor in Italy. Any further work on this project awaits Italian authorities' re-assessment of the future of the project. In conjunction with AECL's Research Company, design work on the Korean Multipurpose Research Reactor (KMRR) proceeded, with AECL's scope on the project reaching about 30 percent completion at year-end. Digital feedwater control systems and a digital system for mitigating power transients in light water reactors were designed and fabricated for TVO of Finland, and will be used for inspection and repair of feedwater pipes in Finnish boiling light water reactors. A contract was obtained via the Canadian Fusion Fuels Test Program for fabrication of uranium scavenger beds.

CANDU Operations

Engineering Services

In the non-nuclear sector, CANDU Operations continued to apply the technology and experience gained from development of the CANDU system to a variety of engineering services jobs. The control system of one of the Courtenay Bay fossil-fired power units in New Brunswick was converted to a digital system and put into successful operation. Radiation monitoring systems were designed and supplied to steel companies for monitoring of scrap steel. Quality assurance training and services, as well as audit services, were provided to large industrial customers. Piping vibration monitoring and analysis were performed for petrochemical firms. Fire protection consultation was provided to a foreign utility. Stress analysis and simulation services were performed for a coal-burning generating station.

Also among the non-nuclear services projects, AECL's work on the Batan electromechanical laboratory in Indonesia is nearing completion. Following this successful project, CANDU Operations and AECL's Research Company entered into a new agreement with Indonesia to develop a master plan for a process technology laboratory to be built in that country.

In its ongoing efforts to apply the CANDU-derived skills to the manufacturing sector, CANDU Operations has provided water-jet cutting services to a number of industrial customers and has extended its product line by developing an integrated vision system. Such systems combine CANDU Operations' skills in computer software and hardware with remote tooling capability and are expected to find use in a host of automated inspection applications. Specific applications being actively pursued include automated inspection of certain nuclear components and inspection of end-caps of fluorescent light bulbs.

Marketing Activities

CANDU marketing and sales activities are funded from the margin on commercial work handled by CANDU Operations. Marketing and sales remained at an appropriate level for the opportunities in Canadian and international markets, with offices maintained in South Korea, the Netherlands, Yugoslavia, Turkey, Romania and the United States.

Korea has updated its Power Development Plan to include a second CANDU 6 at the Wolsong site.

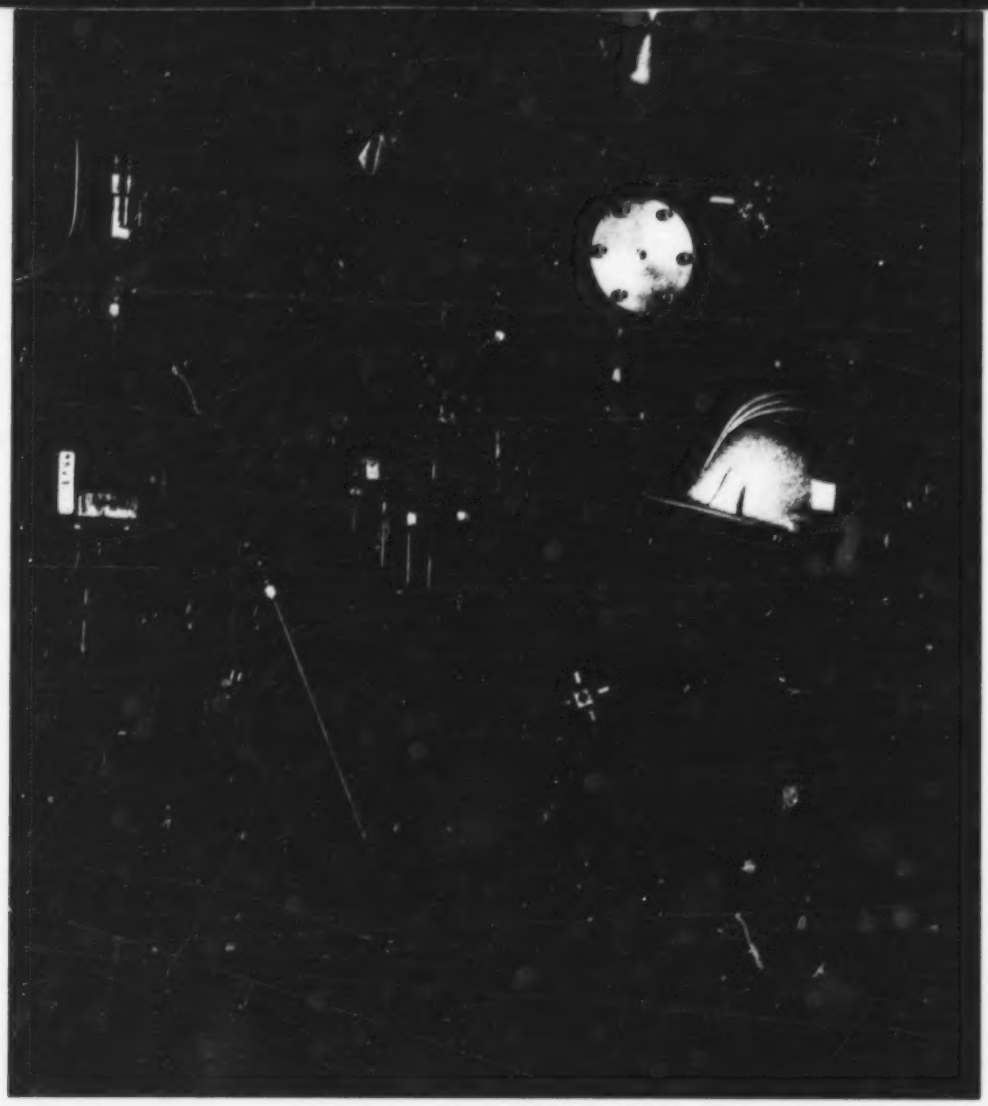
Discussions are progressing with New Brunswick Power toward a contract for construction of the first CANDU 3 plant in Canada. Saskatchewan has expressed similar interest and discussions in that province are under way between AECL, the private sector company Western Project Development Associates, and the Saskatchewan Power Corporation.

CANDU Operations has a lead role in forming a cooperative venture with Ontario's Ministry of Energy and Ontario Hydro to seek involvement in energy projects in China's Jiangsu province, a twin province of Ontario. A CANDU 3 feasibility study by the consortium will begin in 1989.

AECL, in association with Bechtel, has secured a contract in Egypt for a CANDU localization program. Egypt views local manufacture of CANDU components as significant to the potential acquisition of a CANDU power station.

A specific marketing thrust was initiated during the past year to expand CANDU Operations' engineering services in the United States, where more than 100 nuclear power plants using the light water reactors are now in operation, and where a potentially large market for CANDU technology exists. This thrust will be amplified next year, with special focus on digital control and protection systems, largely for retrofit application to power and research reactors.

An office in Washington, D.C., was opened in 1988 to serve as the headquarters of AECL's U.S. operations. AECL Inc. was formed as a wholly owned U.S. subsidiary of AECL.



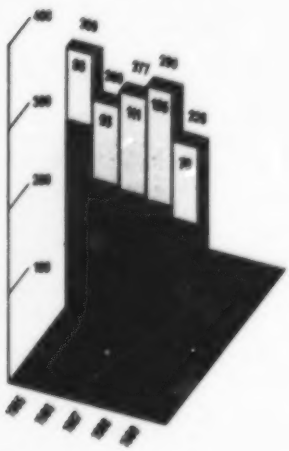
The ingenious CANDU Fuelling Machine has been modified for the Spacer Location And Repositioning (SLAR) program. Test specialist Mike Lonsdale carries out testing procedures on this SLAR Delivery Machine destined for work at the nuclear generating sites at Gentilly, Quebec, and at Pickering, Ontario.

Despite severe business constraints, CANDU Operations has succeeded in sustaining a core capability and a robust organization whose watchword is quality. Recognizing the technical superiority of the CANDU and the exceptional skills of the CANDU Operations team, the company will endeavor to penetrate markets that were previously closed, to pursue the CANDU 3 program beyond the development phase toward commitment for a demonstration plant, to renew effective utility partnership, particularly with CANDU's major user Ontario Hydro, and to establish private sector partners.

Building such a successful nuclear power program requires an organization with a balance of skills in technical, project, business and commercial areas. These skills have been honed through years of experience and are collectively assimilated into a strong organization with a clear mandate, mission and vision. CANDU Operations will continue to develop and enhance such resources needed to launch and implement the next stage of CANDU commercialization.

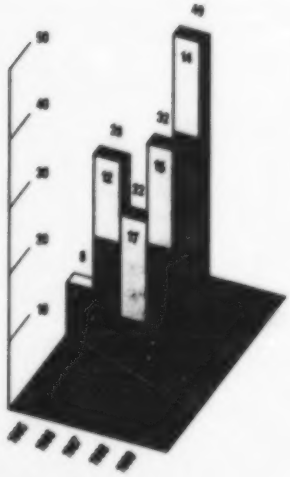
Financial Review

Revenue
Millions of dollars



Nuclear Power Ops
Radiation Equipment

Operating Profit
Millions of dollars



Continuing Ops
Sub. Divested

In the midst of some uncertainty about its future financial profile, the corporation has closed its books on a year of good financial performance. Earnings and cash flow were substantially ahead of the preceding year and exceeded projections in our Corporate Plan. These results were achieved despite a continuing difficult environment in the new power reactor market and the divestment half-way through the year of our profitable commercial business in radiation equipment and isotopes. It is expected that within the next few months the Shareholder will complete its review of recent management recommendations on financial structure, financing of commercial project opportunities and an appropriate level for ongoing federal support of R & D activities. This will provide a firmer financial framework within which to plan for the year now in progress and for the future.

Consolidated net income last year rose to $23.2 million, more than double the $10.4 million in 1988. Net income of only $8 million had been forecast in the Corporate Plan. Important contributions came from excellent collection experience with long-standing contract debt in Argentina, despite the economic difficulties presently facing that country, and from strong first-half results at our former Radiochemical Company division.

One of the most significant events of the year was the sale of the Radiochemical Company and the Medical Products Division to Canada Development Investment Corporation (CDIC) as a first step toward the government's privatization objective for these two businesses. The Radiochemical Company is engaged in the manufacture and marketing of isotopes and related equipment for the international health care market. The Medical Products Division manufactures and markets, to customers worldwide, cancer therapy and treatment-planning equipment. Prior to the sale, the two divisions were incorporated as Nordion International Inc. and Theratronics International Limited, respectively.

Under the terms of this sale, which was effective September 30, 1988, CDIC will pay to AECL the net proceeds realized from eventual privatization. This is expected to generate a capital gain for the corporation but, pending a reliable basis for determining its amount, no gain has yet been recorded and the balance sheet reflects a receivable from CDIC corresponding to the net book value of the businesses sold. Our current Corporate Plan, not yet approved by government, reflects full distribution of the proceeds to the Shareholder upon receipt from CDIC. In the six months ended September 30, 1988, earnings of Nordion and Theratronics totalled $14.1 million compared with a full-year contribution of $15.6 million in fiscal 1988. This has been reported for both periods as income from subsidiaries divested in the Statement of Income.

AECL now has two core operations, Nuclear Power, comprising the business carried out by our CANDU Operations division and certain investments and activities managed by the Corporate Office, and Research and Development which is the responsibility of the Research Company division. In addition, the corporation remains engaged in decommissioning activities. Income from these three continuing operations improved to $9.1 million in 1989 from a loss of $5.2 million in 1988.

Nuclear Power Operations

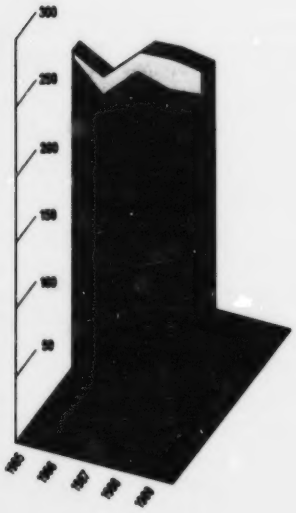
Consolidated revenue under this heading declined six percent from $95.0 million to $88.9 million, largely due to a one-time activity in the earlier year related to equipment supply for a major contract. The absence this year of this low mark-up business, together with a favorable adjustment recognized during the year in respect of costs applicable to 1988 heavy water sales, has given rise to a significant improvement in the ratio of costs of sales and services to related nuclear supply and services revenue. A third contributing factor has been the good performance of the Argentine contract debt.

The extended shutdown of Ontario Hydro's Pickering Units 1 and 2 for pressure tube replacements is now behind us with the return to service of the second unit in November 1988. However, AECL's investment in these installations generated no revenue during the year and is not expected to do so for the next several years because of the impact of shutdown costs on its payback entitlement. Timing of the resumption of payments under the agreement with Ontario Hydro will also be affected by future coal costs at the reference Lambton coal-fired station. Amortization of our Pickering investment resumed during the year and a charge of $2.3 million has been included in costs of sales and services on this account.

Work on CANDU 3 pre-project engineering design continued to progress on target, with the expenditure during the year of $28.0 million reported as part of product development costs. At the beginning of the year, the federal government endorsed this initiative and has so far provided $44.4 million of new funding to support it. Of this amount, $16.4 million is in respect of costs incurred in 1988 and reported in last year's financial statements as a current asset pending receipt of the funds. As explained in Note 2 to this year's statements, 1988 product development costs and related parliamentary appropriations have not been re-stated to include the $16.4 million as costs and funding applicable to that year. Because of increased CANDU 3 activity in 1989, the level of spending on other product development work was significantly below that of 1988.

Reflecting lower overall costs, as well as higher interest income on short-term deposits, the corporation has reported an operating profit this year of $35.1 million from Nuclear Power Operations compared with $16.6 million the previous year.

Research & Development Funding
Millions of dollars



- Internal Funding
- Cost Recovery
- Commercial Revenue
- Appropriation — Special Federal Program
- Appropriation — Base R & D

Research and Development Operations

The corporation aims to cover in full the cost of its R & D operations through funding from external sources and has, in recent years, been working hard to replace diminishing parliamentary appropriations with more commercial revenue and cost recovery arrangements with provincial utilities and other third parties. Some further progress was made this year and net expense of total operations absorbed internally declined from $21.9 million in 1988 to $19.3 million in 1989. However, to achieve this it was necessary to obtain the agreement of the government, reported in our last Annual Report, to reduce the fourth tranche of the five-year cutback in federal funding from a further $25 million originally scheduled to be effective in 1989 to $10 million (both figures in dollars of the 1985 budget year). Nevertheless, it is noteworthy that commercial and cost recovery revenue this year totalled $82 million compared with $27 million in 1985. The level of parliamentary appropriations available to AECL in the year now in progress is currently under review.

In 1989, total R & D expenses were $248.2 million, marginally lower than the re-stated $251.5 million in 1988 (re-stated to include the cost of isotopes produced for the Radiochemical Company, previously eliminated as an inter-divisional transaction). After allowance for inflation, however, expenses in real terms were down from the year earlier by approximately five percent.

Capital spending on property, plant and equipment not primarily for the generation of commercial revenue, and therefore included in total research and development expenses, amounted to $14.1 million, materially lower than last year's $22.0 million. In addition, however, $6.4 million was invested in commercially oriented production facilities, principally related to isotope supply arrangements for Nordion International, with capital contributions provided by that company. In 1988, capital expenditures of this sort were minimal.

Decommissioning Activities

The decommissioning program for the Nuclear Power Demonstration (NPD) reactor continued during the year on target. This reactor was placed in a safe storage mode by the end of the year. Maintenance and surveillance activities continued for all facilities that are already in safe storage, namely the Gentilly-1 and Douglas Point prototype reactors as well as the Cape Breton and LaPrade heavy water plants.

Total costs, including $9.4 million for the NPD program, amounted to $18.6 million, compared with $23.0 million in the preceding year. Although decommissioning expenses are normally fully offset by parliamentary appropriations and proceeds from related asset sales, a net expense of $6.7 million has been reported from this year's activities and has been financed by the retention of 1988 heavy water sale proceeds normally returned to the government. This retention has in turn reduced reported costs of sales and services of Nuclear Power Operations as mentioned under that heading.

Changes in Financial Position

Cash generated from operations in the year totalled $47.4 million. This comprised $29.5 of earnings before non-cash charges for depreciation and amortization and $17.9 million released from the corporation's investment in operating working capital as a result, principally, of the receipt of government funding applicable to the previous year's spending on the CANDU 3 development project. In 1988, a lower level of earnings and a requirement to build up the working capital investment produced cash flow from operations of only $6.9 million.

Investing activities were modest and, net of disposal proceeds, involved an outlay of only $3.6 million on the acquisition of commercial fixed assets. This was closely in line with the net investment level of the previous year. Generation of funds from the divestment this year of Nordion and Theratronics will not occur until collection of the CDIC receivable, together with any associated capital gain, upon final privatization of these companies.

At year-end, a dividend of $16.4 million was paid to the Shareholder as part of overall arrangements with the government for CANDU 3 funding and in light of the corporation's high immediate liquidity.

Thus, net cash flow from all sources contributed $26.6 million over the course of the year, compared with $2.2 million in 1988. Total cash and short-term deposits increased to $86.6 million from $60.0 million a year earlier. This strong cash position is enabling AECL, with full Shareholder concurrence, to continue R & D and CANDU 3 pre-project activities for the first few months of the 1990 fiscal year at approximately the same levels as in 1989, even though government funding support corresponding to these activity levels has not yet been committed. As indicated earlier in this Financial Review, a decision by the government on AECL's financial modus operandi for the future is expected shortly.

Management Responsibility

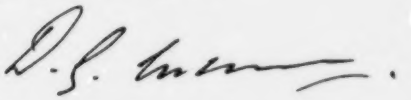
The financial statements and all other information presented in this Annual Report are the responsibility of the management and the Board of Directors of the corporation. The financial statements have been prepared in accordance with generally accepted accounting principles and include estimates based on the experience and judgement of management.

The corporation maintains books of account, financial and management control, and information systems, together with management practices designed to provide reasonable assurance that reliable and accurate financial information is available on a timely basis, that assets are safeguarded and controlled, that resources are managed economically and efficiently in the attainment of corporate objectives, that operations are carried out effectively and that transactions are in accordance with Part X of the Financial Administration Act and its regulations, as well as the articles, the bylaws and policies of the corporation. The corporation has met all reporting requirements established by the Financial Administration Act, including submission of a corporate plan, an operating budget, a capital budget and this Annual Report.

The corporation's internal auditor has the responsibility for assessing the management systems and practices of the corporation. The Auditor General of Canada conducts an independent examination of the financial statements of the corporation and reports on his examination to the Minister of Energy, Mines and Resources.

The Board of Directors' Audit Committee, composed of directors who are not employees of the corporation, reviews and advises the Board on the financial statements, the Auditor General's reports thereto and the plans and reports related to special examinations, and oversees the activities of internal audit. The Audit Committee meets with management, the internal auditor and the Auditor General on a regular basis.

S.R. Hatcher
Acting President and
Chief Executive Officer



D. G. Cuthbertson
Vice-President, Finance and
Chief Financial Officer

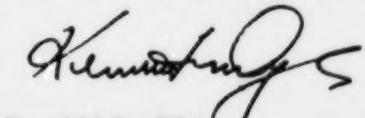
Auditor's Report

To the Minister of Energy, Mines and Resources

I have examined the balance sheet of Atomic Energy of Canada Limited as at March 31, 1989, and the statements of income, contributed capital, retained earnings and changes in financial position for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as I considered necessary in the circumstances.

In my opinion, these financial statements present fairly the financial position of the corporation as at March 31, 1989, and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Further, in my opinion, the transactions of the corporation that have come to my notice during my examination of the financial statements have, in all significant respects, been in accordance with Part X of the Financial Administration Act and regulations, the articles and the bylaws of the corporation.



Kenneth M. Dye, F.C.A.
Auditor General of Canada

Ottawa, Canada
May 5, 1989

Summary of Significant Accounting Policies

These financial statements have been prepared in accordance with generally accepted accounting principles applied on a consistent basis. The most significant accounting policies are summarized below:

Foreign Currency Translation

Transactions denominated in a foreign currency are translated into Canadian dollars at the exchange rate in effect at the date of the transaction, except those covered by forward exchange contracts, where the rate established by the terms of the contract is used. Monetary assets and liabilities outstanding at the balance sheet date are adjusted to reflect the exchange rate in effect at that date. Exchange gains and losses arising from the translation of foreign currencies are included in income.

Inventories

Radiation equipment and materials are valued at the lower of average cost and net realizable value. Maintenance and general supplies are valued at cost. Heavy water is valued at the lower of average cost, less related parliamentary appropriations, and net realizable value.

Investment and Deferred Costs

Investment and deferred costs are recorded at cost and charged to the revenue derived therefrom over the expected period of revenue generation

Property, Plant and Equipment

Property, plant and equipment of a research and development nature are recorded at cost and expensed in the year of acquisition.

Other property, plant and equipment are recorded at cost and depreciated on a straight-line basis over the estimated useful life of the asset as follows:

Machinery and equipment — 3 to 20 years
Buildings — 20 to 50 years

Costs of decommissioning nuclear facilities are expensed when incurred.

Long-term Contracts

Revenue and costs on long-term contracts are accounted for by the percentage of completion method, applied on a conservative basis to recognize the absence of certainty on these contracts. Full provision is made for all estimated losses to completion of contracts in progress.

Parliamentary Appropriations

The Government of Canada, through parliamentary appropriations, funds certain operations of the corporation as outlined in Note 2. The parliamentary appropriations are offset against the applicable expenditures except for the portion used to discharge certain loan principal which is recognized as an increase in contributed capital.

Pension Plan

Employees are covered by the Public Service Superannuation Plan administered by the Government of Canada. The corporation's contributions to the Plan are limited to an amount equal to the employees' contributions on account of current service. These contributions represent the total pension obligations of the corporation and are charged to income on a current basis.

Employee Termination Benefits

Employees are entitled to specific termination benefits as provided for under collective agreements and conditions of employment. The liability for these benefits is charged to income as benefits accrue to the employees.

Statement of Income

For the year ended March 31, 1989 (thousands of dollars)

	1989	1988
NUCLEAR POWER OPERATIONS		
Revenue		
Nuclear supply and services	$ 88,922	$ 95,049
Interest on long-term receivables	59,664	64,338
Interest on short-term deposits	9,137	5,662
	157,723	165,049
Costs and expenses		
Costs of sales and services	41,341	61,790
Product development (Note 2)	33,023	10,183
Less: Parliamentary appropriations (Note 2)	(28,000)	—
Marketing and administration	22,287	20,464
Interest on long-term debt	53,952	55,983
	122,603	148,420
Operating profit	35,120	16,629
RESEARCH AND DEVELOPMENT OPERATIONS		
Expenses	248,216	251,455
Less: Commercial revenue	32,258	27,604
Cost recovery	49,808	48,299
Parliamentary appropriations (Note 2)	146,879	153,700
Net expense	19,271	21,852
DECOMMISSIONING ACTIVITIES		
Expenses	18,632	22,953
Less: Parliamentary appropriations (Note 2)	10,309	20,342
Recovery from asset sales	1,598	2,611
Net expense	6,725	—
Income (loss) from continuing operations	9,124	(5,223)
Income from subsidiaries divested (Note 3)	14,109	15,583
Net income	$ 23,233	$ 10,360

Balance Sheet

As at March 31, 1989
(thousands of dollars)

	1989	1988
ASSETS		
Current		
Cash and short-term deposits	$ 86,588	$ 59,950
Accounts receivable	147,776	168,048
Receivable from CDIC (Note 3)	114,607	—
CANDU 3 pre-project costs (Note 2)	—	16,410
Inventories (Note 4)	3,727	58,412
	352,698	302,820
Heavy water inventory (Note 4)	8,586	9,488
Long-term receivables (Note 5)	541,343	567,541
Investment and deferred costs (Note 6)	81,704	106,104
Property, plant and equipment (Note 7)	9,576	50,311
	$ 993,907	$1,036,264
LIABILITIES		
Current		
Accounts payable and accrued liabilities	$ 112,592	$ 136,576
Current portion of long-term debt	31,346	28,214
	143,938	164,790
Deferred revenue	31,408	28,465
Accrued employee termination benefits	39,865	41,289
Long-term debt (Note 8)	562,986	594,332
	778,197	828,876
SHAREHOLDER'S EQUITY		
Capital stock		
Authorized — 75,000 common shares		
Issued — 54,000 common shares	15,000	15,000
Contributed capital	73,907	72,418
Retained earnings	126,803	119,970
	215,710	207,388
	$ 993,907	$1,036,264

Approved by the Board:

M. Paikin, Director

S.R. Hatcher, Director

Statement of Contributed Capital

For the year ended March 31, 1989 (thousands of dollars)

	1989	1988
Balance at beginning of the year	$ 72,418	$ 71,051
Parliamentary appropriations for loan principal repayment	1,489	1,367
Balance at end of the year	$ 73,907	$ 72,418

Statement of Retained Earnings

For the year ended March 31, 1989 (thousands of dollars)

	1989	1988
Balance at beginning of the year	$119,970	$109,610
Net income	23,233	10,360
Dividend	(16,400)	—
Balance at end of the year	$126,803	$119,970

Statement of Changes in Financial Position

For the year ended March 31, 1989 (thousands of dollars)

	1989	1988
OPERATING ACTIVITIES		
Net income	$ 23,233	$ 10,360
Depreciation and amortization	6,211	6,427
	29,444	16,787
Decrease (increase) in operating working capital	17,912	(9,892)
Cash from operations	47,356	6,895
INVESTING ACTIVITIES		
Divestment of subsidiaries (Note 3)	114,607	—
Receivable from CDIC (Note 3)	(114,607)	—
Acquisition of commercial property, plant and equipment, net of disposal	(3,569)	(3,009)
Increase in deferred costs	—	(606)
Cash invested	(3,569)	(3,615)
FINANCING ACTIVITIES		
Repayment of long-term debt	(28,214)	(26,352)
Proceeds from long-term notes receivable	25,976	23,954
Dividend	(16,400)	—
Parliamentary appropriations for loan principal repayment	1,489	1,367
Cash used in financing	(17,149)	(1,031)
Increase in cash and short-term deposits	26,638	2,249
Cash and short-term deposits at beginning of the year	59,950	57,701
Cash and short-term deposits at end of the year	$ 86,588	$ 59,950

Notes to the Financial Statements

For the year ended March 31, 1989

1. ACCOUNTING POLICIES

The summary of significant accounting policies is an integral part of these financial statements.

2. PARLIAMENTARY APPROPRIATIONS

Parliamentary appropriations were used during the year for the following purposes:

	1989	1988
		(thousands of dollars)
Research and development operations	$146,879	$153,700
CANDU 3 pre-project costs	44,400	—
Decommissioning activities	10,309	20,342
Heavy water plant loan principal	1,489	1,367
	$203,077	$175,409

Parliamentary appropriations of $44.4 million received this year were in respect of $16.4 million of expenditures in 1988 on pre-project detail engineering of the CANDU 3 power reactor and of a further $28.0 million spent in 1989 on this program. Pending receipt of government funding, the $16.4 million was reflected as a current asset in the balance sheet and was not reported as part of total product development costs of that year. The product development costs and parliamentary appropriations for 1989 include the $28.0 million for this year, but the 1988 figures have not been re-stated to include the $16.4 million.

3. SUBSIDIARIES DIVESTED

In March 1988, the Government of Canada announced its intention to privatize the corporation's radiation equipment and isotope businesses conducted by the Radiochemical Company and the Medical Products Division, both operating divisions of the corporation. During the year, these divisions were incorporated under the names Nordion International Inc. (Nordion) and Theratronics International Limited (Theratronics), respectively. On September 30, 1988, the corporation sold its shares in Nordion and Theratronics to Canada Development Investment Corporation (CDIC) for eventual privatization. Under the terms of the agreement with CDIC, the corporation will receive full proceeds realized upon the privatization of Nordion and Theratronics, less CDIC's expenses associated therewith. While the corporation anticipates a gain on sale, the amount cannot reasonably be determined at this time. A receivable from CDIC of $114.6 million, equal to the net book value on September 30, 1988, of the businesses sold, has been recorded in the accounts. A significant portion of the changes in balance sheet figures for accounts receivable, inventory, deferred costs, fixed assets, accounts payable and employee termination benefits relates to the net book values of the businesses sold.

Income from Nordion and Theratronics for the six months ended September 30, 1988, and for the 12 months ended March 31, 1988, has been reflected in the income statement as income from subsidiaries divested and all revenue and expense figures for the 1988 year have accordingly been re stated as necessary. Revenues of Nordion and Theratronics were $70 million for the six-month period in the 1989 year and $125 million for the full 1988 year.

4. INVENTORIES

	1989	1988
		(thousands of dollars)
Current		
Maintenance and general supplies	$ 3,727	$ 4,165
Radiation equipment and materials	—	54,247
	$ 3,727	$ 58,412
Heavy water	$548,964	$555,953
Less: Parliamentary appropriations	540,378	546,465
	$ 8,586	$ 9,488

Parliamentary appropriations for heavy water are repayable to the government, together with interest thereon, to the extent of future revenue from sales of related heavy water. Accrued liabilities as at March 31, 1989, include $4.9 million in respect of net proceeds from sales during the year (1988 — $6.7 million). During the year, the corporation was authorized to retain the 1988 net proceeds of $6.7 million to compensate for net expenses incurred in 1989 decommissioning activities.

5. LONG-TERM RECEIVABLES

	1989	1988
		(thousands of dollars)
Notes receivable from provincial utilities in respect of the financing of nuclear facilities (refer to Note 8 for related debt)	$550,289	$576,265
Contract receivables maturing through 1995	35,719	32,941
Mortgages receivable and other	3,462	4,103
	589,470	613,309
Current portion	48,127	45,768
	$541,343	$567,541

Notes to the Financial Statements

For the year ended March 31, 1989

6. INVESTMENT AND DEFERRED COSTS

	1989	1988
		(thousands of dollars)
Investment in Pickering 1 and 2 The corporation, Ontario Hydro and the Province of Ontario are parties to an agreement for the construction and operation of Units 1 and 2 of the Pickering 'A' nuclear generating station, with ownership of these Units being vested in Ontario Hydro. Under the agreement, the corporation is entitled to receive payments until the year 2003 based on the net operational advantage of the power generated by Pickering Units 1 and 2 as compared with the coal-fired Lambton Units 1 and 2.	$ 81,704	$ 84,012
Deferred costs Costs incurred in modifying non-corporation-owned facilities for revenue-producing purposes and other deferred costs.	—	22,092
	$ 81,704	$106,104

Pickering Units 1 and 2 returned to service in October 1987 and November 1988 after a prolonged shutdown for pressure tube replacements. During this period there was no amortization of the investment. The timing of the resumption of payments under the agreement is uncertain. However, amortization of the investment recommenced with the return to service of the second unit. The charge against 1989 earnings amounted to $2.3 million (1988 — nil).

7. PROPERTY, PLANT AND EQUIPMENT

	1989			1988
	Cost	Funding and accumulated depreciation	Net	Net
		(thousands of dollars)		
Nuclear power operations				
Land and improvements	$ 1,169	$ 565	$ 604	$ 1,321
Buildings	9,830	9,733	97	28,172
Machinery and equipment	18,933	14,244	4,689	18,198
	29,932	24,542	5,390	47,691
Research and development operations				
Land and improvements	11,537	11,537	—	—
Buildings	80,346	77,765	2,581	2,620
Reactors and equipment	231,636	230,031	1,605	—
Construction in progress	52,582	52,582	—	—
	376,101	371,915	4,186	2,620
	$406,033	$396,457	$ 9,576	$ 50,311

Depreciation of property, plant and equipment for the year ended March 31, 1989, amounted to $3.1 million (1988 — $5.0 million).

Research and development property, plant and equipment expensed during the year amounted to $14.1 million (1988 — $22.0 million).

8. LONG-TERM DEBT

	1989	1988
		(thousands of dollars)
Loans from Government of Canada		
To finance provincial utility nuclear facilities maturing through 2008 at fixed interest rates varying from 6.687% to 9.706% (refer to Note 5 for related receivables).	$549,774	$575,678
To finance leased heavy water and other assets, maturing through 2003 at fixed interest rates varying from 4.125% to 10%.	24,002	24,854
Loans from third parties		
To finance the purchase of the Glace Bay heavy water plant, maturing through 1998 at an imputed interest rate of 8.875%.	20,556	22,014
	594,332	622,546
Current portion	31,346	28,214
	$562,986	$594,332

Loan repayments required over succeeding years are as follows (millions of dollars): 1990 — $31.3; 1991 — $33.9; 1992 — $36.6; 1993 — $33.1; 1994 — $16.0; and subsequent to 1994 — $443.4.

9. DECOMMISSIONING ACTIVITIES

Decommissioning activities consist of placing and maintaining prototype reactors in a safe storage mode as the initial stage of decommissioning, as well as the activities associated with closure and protection of heavy water plants.

Prototype reactors

The decommissioning of nuclear research and prototype facilities is an integral part of the nuclear program. Currently, the Gentilly-1, Douglas Point and Nuclear Power Demonstration (NPD) prototype reactors are in a safe storage mode. The balance of the NPD program is proceeding on target with an estimated cost to complete of $4 million. The WR-1 reactor was shut down in 1985 and a decommissioning program for this reactor is currently being developed.

Future net costs related to decommissioning nuclear facilities beyond the safe-storage mode cannot be quantified at this time due to the uncertainty as to the exact nature, timing and ultimate disposal alternatives. In accordance with the corporation's accounting policy, any such costs will be expensed when incurred.

All reactors in the decommissioning stage have been fu.ly written off. The original gross cost of these reactors is $216 million, including $31 million for capitalized heavy water.

Heavy water plants

The corporation has closed down its heavy water plants located in Glace Bay and Port Hawkesbury in Cape Breton, Nova Scotia and in LaPrade, Quebec. These assets, which have been fully written off, had an original gross cost of $803 million.

Notes to the Financial Statements

For the year ended March 31, 1989

10. RELATED PARTY TRANSACTIONS

In addition to the transactions disclosed elsewhere in these financial statements, the corporation had the following transactions with the Government of Canada:

	1989	1988
	(thousands of dollars)	
Repayment of loans and interest	$ 85,005	$ 84,538
Payments to the Public Service Superannuation Plan	$ 11,586	$ 12,555

In the normal course of business, the corporation also enters into various transactions with the Government of Canada, its agencies and other Crown corporations.

11. COMPARATIVE FIGURES

Certain reclassifications have been made to the 1988 comparative figures to conform with the current year's presentation. The most significant of these reclassifications is referred to in Note 3.

12. SUPPLEMENTARY INFORMATION

Incorporation

Pursuant to the authority and powers of the Minister of Energy, Mines and Resources under the Atomic Energy Control Act, the corporation was incorporated in 1952 under the provisions of the Canada Corporations Act (and continued in 1977 under the provisions of the Canada Business Corporations Act) to develop the utilization of atomic energy for peaceful purposes.

The corporation is a Schedule III Part I Crown corporation under the Financial Administration Act. The corporation is exempt from income taxes.

Insurance

To the extent deemed appropriate, the corporation carries conventional insurance for its facilities and heavy water inventories. Decommissioned prototype reactors are self-insured.

Sales Agents' Remuneration

Guidelines concerning the commercial practices of Crown corporations require disclosure of sales agents and the total remuneration paid to them during the year.

Remuneration and expenses paid to the following sales agents and representatives in 1989 aggregated $2.5 million (1988 — $2.4 million):

B.C. Park, U.S.A.; Bio Nuclear Diagnostica Industria E. Comercio Ltda., Brazil; Equipo Para Hospitales, S.A., Mexico; Gammaster BV, Netherlands; General Machinery Company Ltda., Chile; Gemed Sistemas Medics C.A., Venezuela; G.E. (U.S.A.) Electromediacía, Spain; International de Energia Nuclear, Mexico; International General Electric Co. (India) Ltd., India; Jacobson Van Den Berg (Hong Kong) Ltd., Hong Kong; Korea General Trading, Korea; Kostas Karayannis, S.A., Greece; Marubeni Corporation, Japan; Medtel, Australia; M.L. Sethi, India; Rashid Trading Corporation Ltd., Bangladesh; Sabbagh, Jordan; Spring Port Taiwan Limited, Taiwan; PII — PED International Inc., U.S.A.; P.T. Sanga Kencana International, Indonesia; Radiotherapy & Medical Systems Pty Ltd., Australia; Societa Lombarda Di Televisione s.r.l., Italy; Sumta Inc., Turkey; Tamathe s.r.l., Argentina; Technologia EM Radiocoa, Brazil; Zelin Limited.

Five-Year Financial Summary

	1989	1988	1987	1986	1985
			(millions of dollars)		
OPERATIONS					
Revenue:					
Nuclear power operations	158	165	166	167	226
Radiation equipment and isotopes*	70	125	111	93	83
	228	290	277	260	309
Operating profit*	49	32	22	28	8
Net income	23	10	17	17	10
Research and development expenses	248	251	242	226	236
FINANCIAL POSITION					
Cash and short-term deposits	87	60	58	55	123
Long-term receivables	541	568	597	699	748
Investment and deferred costs	82	106	108	110	112
Capital expenditures	23	26	28	23	30
Property, plant and equipment	10	50	54	52	55
Total assets	994	1,036	1,018	1,107	1,226
Long-term debt	563	594	623	649	722
Shareholder's equity	216	207	196	177	148
OTHER					
Parliamentary appropriations	203	175	218	275	326
Export revenues	121	179	150	141	145
Number of employees	4,274	4,892	5,007	5,540	6,767

*Includes the results of Nordion and Theratronics up to September 30, 1988, the date of sale to Canada Development Investment Corporation.

The Board of Directors

*†• **B.A. Bénéteau,** B.Sc.,
Chairman of the Board
(until June 15, 1988)

*† **James Donnelly,** A.R.T.C.,
President and Chief Executive Officer
(see note No. 1)

*‡ **M.C. Burns,** B.A.,
Principal,
The Sentinel Group

*† **L.J. Celeste,** B.Sc.E.E.,
President and Chief Executive Officer,
The New Brunswick Telephone Co. Ltd.

L.C. DeGroot,
B.Sc.Mech.,P.Eng.,D.B.Adm.,
President,
Bridgings International Inc.

‡ **P.H. Harris,**
Q.C.,B.Adm.,LL.B.,
Partner,
Perry & Outerbridge

*† **S.R. Hatcher,**
B.Sc.,M.Sc.,Ph.D.,P.Eng.,
F.C.I.C.,
President and Chief Executive Officer
(see note No. 1)

L. Martin, B.A.,LL.L.,
Partner,
Clarkson, Tétrault
(until January 17, 1989)

•*† **M. Palkin,** B.A.,LL.D.,
(appointed Acting Chairman of the Board on April 24, 1989)

• **Dr. K. Rao,** M.D.,F.R.C.P.C.,
Partner,
Associated Radiologists of Saskatoon

†•‡ **I.S. Ross,**
P.Eng.,C.Eng.(U.K.),M.C.I.T.,
Consulting Engineer

• **J.I.Schlosser,** C.M.,LL.D.,
President,
Tri-Jay Investments

D.R. Sellen, B.A.,LL.B.,
Partner,
Deeley, Fabbri, Sellen

J.J. Vacchino, M.El.,
President,
Vacchino Holdings Ltd.

* Committee on Executive Management and Compensation
† Executive Committee
• Audit Committee
‡ Corporate Marketing Committee (new as of April 1989)

(1) Mr. J. Donnelly retired on April 9, 1989.
Dr. S.R. Hatcher was appointed Acting President and Chief Executive Officer and a director of the corporation on that date.

Officers

Executive

James Donnelly, A.R.T.C.,
President and Chief Executive Officer
(retired April 9, 1989)

D.G. Cuthbertson, C.A., Corporate Vice-President, Finance and Chief Financial Officer

H.T. Hughes, B.Comm., Corporate Vice-President, Human Resources

M. Therrien, B.Sc.A.,P.Eng.,
Corporate Executive Vice-President

R. Veilleux, C.D.,B.Sc.,P.Adm.,
Corporate Secretary and Vice-President, Corporate Relations

T.A. Wardrop, Q.C.,B.A.
General Counsel

E. Deslauriers, L.S.C.,C.A.,
Treasurer

L. Carisse, Assistant Corporate Secretary

Operating

S.R. Hatcher,
B.Sc.,M.Sc.,Ph.D.,P.Eng.,F.C.I.C.,
President, Research Company
(appointed Acting President and Chief Executive Officer on April 9, 1989)

D.S. Lawson, B.Sc.,P.Eng.,
President, CANDU Operations

AECL Locations

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344 Slater Street
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K1A 0S4

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1155 Metcalfe Street, Second Floor
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H3B 2V6

CANDU Operations Head Office
Sheridan Park Research Community
Mississauga, Ontario
L5K 1B2

CANDU Operations Montreal Office
1155 Metcalfe Street, Second Floor
Montreal, Quebec
H3B 2V6

Research Company Head Office
344 Slater Street
Ottawa, Ontario
K1A 0S4

Chalk River Nuclear Laboratories
Chalk River, Ontario
K0J 1J0

Whiteshell Nuclear Research Establishment
Pinawa, Manitoba
R0E 1L0

Heavy Water — Maritime Sites
P.O. Box 698
Port Hawkesbury, Nova Scotia
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Pour obtenir la version française du présent rapport, il suffit d'écrire au Siège social de l'EACL, 344 rue Slater, Ottawa (Ontario) K1A 0S4.

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